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# STUDIES ON SHARK MUSCLE. PART 1. HISTOCHEMICAL STUDIES OF UREA IN SHARK MUSCLE.

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Since 1858, the presence of a large amount of urea in shark muscle has been known, but histochemical studies have not yet been reported. At the beginning of this shark muscle study, therefore, histochemical investigations have been carried out. In this paper, the position of urea in the microscopical shark muscular tissue and the crystal form of urea are described.

## Experimental

Two sharks were used as the experimental materials. The one was a female of "Hoshizame" fish *Mustelus manazo* BLEEKER taken off Maizuru on April 23rd, 1951, 85cm. in total length and 2,850 g. in body weight; several young fish were in its embryo sac. The other was a male of "Dochizame" fish *Triakis scyllium* MUELLER *et* HENLE which was taken at the same place, on June 13th, 1951, 90 cm. in total length and 1,850 g. in body weight. The dorsal muscles of these fish were cut off in 1 cm. cube blocks, and fixed by the STUEBEL method or OLIVER method <sup>(1)</sup>; in this process the urea is crystalized as dixanthylurea. These blocks, after imbedding with carbowax, were cut 5 $\mu$  in thickness, stained with heamatoxylin and eosin, then examined microscopically. Results are shown in the following plates.

In any specimen, cross striation, nucleus and sarcolemma of muscular fiber are shown. From plates 1 to 8, they are cited to the rank of crystal size. Crystals in the center of specimens are smaller in size and less in number than those on the outside, though the cause of this difference is not completely explainable. In plates 9 and 10, is shown a group of crystals. Such a gathering is found on the outside of specimens. This transfer of urea to the outside in crystallizing as dixanthylurea from the inside tissue, is also presumed as in the previous paper <sup>(2)</sup>. The presence or absence of urea in the muscular fiber has not been obvious till now. But, the sarcolemma is stressed by the formation of crystal as shown in plate 11, and broken down by the stressing of crystal in plate 12. Observing these results, it may be considered that urea is present in the shark muscular fiber after crystallizing as dixanthylurea, though its presence in natural state is unknown, as heretofore.

## Summary

Urea is found in the shark muscular fiber as far as examined as dixanthylurea; the size of such crystals was smaller and their number less on the inside as compared with outside



Plate 1. *Mustelus manaso*.  
Fixed on the catching day  
by the Oliver method. 62×10



Plate 2. ditto



Plate 3. ditto



Plate 4. ditto 40×15



Plate 5. ditto 62×10



Plate 6. ditto



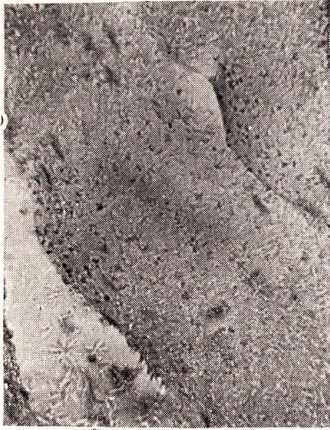


Plate 7. ditto



Plate 8. *Triakis scyllium*. Fixed after 17 days of catching by the Stuebel method.  $62\times 10$



Plate 9. *Triakis scyllium*. Fixed after 8 days of catching by the Stuebel method.  $62\times 10$

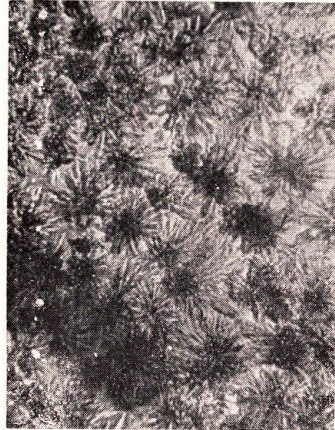


Plate 10. ditto

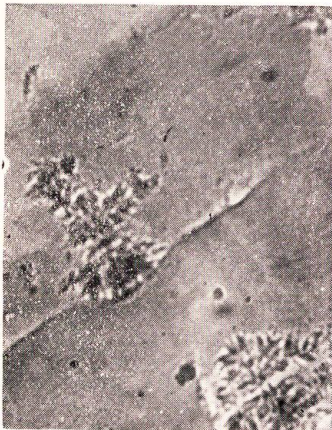


Plate 11. *Mustelus manazo*. Fixed on the catching day by the Oliver method.  $62\times 10$

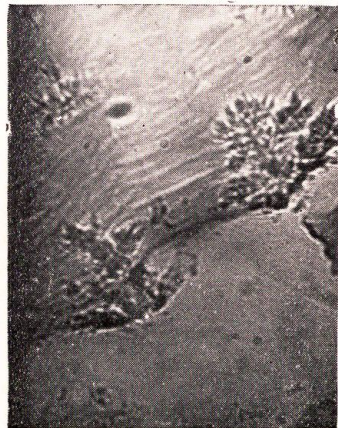


Plate 12. ditto

of these specimens.

#### Literature cited

- (1). U. Mori (1949): *Soshikikagaku no riron to hōhō*. 84, 2nd ed.
- (2). K. Ohoishi (1952): *Kagaku*, Vol. 22, 424.

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